PATENT
Attorney Docket No. DPL-031
(027324/156214)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPLICANT:	Shu *et al.*		
SERIAL NO.:	10/790,584	GROUP NO.:	2617
FILING DATE:	March 1, 2004	EXAMINER:	Ho, Huy C.
TITLE:	Manet Routing Based on Best Estimate of Expected Position		

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APPEAL BRIEF

This Appeal Brief is submitted in accordance with 37 C.F.R. §41.37 pursuant to the Notice of Appeal filed December 3, 2007, in support of the appeal from final rejection of pending claims in the above-identified application.

Appellants believe that no extensions-of-time are required for this paper to be entered and considered. If, however, any extensions or fees are due, please consider this a conditional petition for the proper extension and a conditional authorization to charge any related extension fees or other fees necessary for entry of this paper to Deposit Account No. 07-1700 with reference to docket number DPL-031.

REAL PARTY IN INTEREST

The real party in interest is the owner of the present application, Imprivata, Inc.

RELATED APPEALS AND INTERFERENCES

No other appeals or interferences directly affect or will be directly affected by the Board's decision in the present appeal.

STATUS OF CLAIMS

The application as filed contained 26 claims, and in an amendment filed on May 4, 2007, Applicants amended claims 1 and 22. Claims 1-26 remain pending, have been rejected, and are the subject of this appeal.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Office Action mailed on August 10, 2007 (the "8/10/07 Office Action").

SUMMARY OF CLAIMED SUBJECT MATTER

In one aspect and as recited in independent claim 1, the invention relates to a method for communicating via a network comprising multiple nodes.[1] The future physical location of a destination node at the time of arrival of a message unit at the destination unit is predicted.[2] An intermediate node is selected for relaying the message

[1] Specification at Paragraph [0027].
[2] Specification at Paragraph [0028].

unit between a source node and the destination node in response to the predicted future physical location of the destination node.[3]

In another aspect and as recited in independent claim 22, the invention relates to an apparatus for routing communications via a network comprising nodes.[4] The apparatus includes a location prediction processor for predicting a future physical location of a destination node upon arrival of a message unit at the destination node.[5] The apparatus also includes a relay node selector for selecting an intermediate node for relaying the message unit between a source node and the destination node in response to the predicted future physical location of the destination node.[6]

GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

The issues on appeal are whether claims 1-8, 10-16, 21-23 and 25 are unpatentable under 35 U.S.C. §102(e) over U.S. Patent No. 7,006,453 to Ahmed et al. ("Ahmed"), whether claim 9 is unpatentable under 35 U.S.C. §103(a) over Ahmed and U.S. Patent Publication No. 2004/0219909 to Kennedy ("Kennedy"), and whether claims 17-20, 24 and 26 are unpatentable under 35 U.S.C. §103(a) over Ahmed and U.S. Patent Publication No. 2005/0076054 to Moon et al. ("Moon").

[3] Specification at Paragraph [0029].
[4] Specification at Paragraph [0041].
[5] Specification at Paragraph [0042].
[6] Specification at Paragraph [0042].

ARGUMENT

I. *The Invention*

In mobile networks (i.e., networks that include non-stationary nodes), message routing may be improved by selecting a relay node that anticipates location of the final destination node at the time the messages arrive at the destination node. The invention provides such an improvement, and is well-suited to wireless networks of mobile nodes that have time-varying communication links therebetween, as well as networks in which changing node positions are not completely predictable.

Networks in which the invention is implemented feature nodes that carry information about the locations and trajectories of other nodes. When sending a message, an originating node estimates the expected location of the destination node when a message packet is expected to arrive there, and forwards the message along a best route towards that location. A decision regarding which neighboring node to select as a next intermediate node, as well as further intermediate nodes in a path, can be made with reference to collected location and trajectory information for all the nodes in the network. Thus, nodes in a network may store and update information about the locations and trajectories of other nodes in the network, and prior to sending a message or message unit, an originating node can estimate a destination node's location within the network at the expected time of receipt, and may determine an associated route through the network based thereon.

II. *Claims 1 – 8, 10 – 16, 21 – 23 and 25 Are Not Anticipated by Ahmed*

We respectfully submit that, in rejecting the independent claims (claims 1 and 22) the Examiner has both read too much into the cited art and too little into the present claims. Specifically, none of the cited references discloses or even suggests the ability to predict the future location of a network node and use that information to influence routing of messages sent through the network.

Independent claims 1 and 22 both recite routing communications by predicting a *future physical location* where a destination node will be located *upon arrival* of a message unit relayed to the destination node. Ahmed neither teaches nor suggests this feature, and the Examiner cites no portion of Ahmed that might be relevant.

In particular, Ahmed describes a conventional approach to a geometry-based protocol for routing traffic from a source node to a destination node. Ahmed relies on a "distance-based" method for determining a node to which packets outside the local topology are to be sent.[7] Each node maintains a list of its neighboring nodes and the current distances to these nodes, and uses these distances in determining how to forward messages.[8] The distance measurements, calculations, and propagation of these values are performed periodically (e.g., every second) for each node to "continually update, or create its local topology."[9]

Ahmed simply does not contemplate the routing of messages according to a future network topology (e.g., where a particular node will be) and therefore does not predict a

[7] Ahmed, col. 2, lines 21-24.
[8] Ahmed, col. 5, lines 10-22.
[9] Ahmed, col. 6, line 23-23.

future physical location of a destination node or select intermediate nodes based thereon, as required by the present claims. In short, Ahmed's approach relies on information relating to the current (not future) network topology, which may be obsolete by the time the message traverses the network.

Applicants' use of predicted future locations of nodes as a basis for determining a routing path is clearly distinct from the conventional technique described by Ahmed. Whereas Applicants' invention accommodates changes in the location of the destination location, Ahmed's approach will either used outdated information or require an update of the network topology prior to transmission. The burden is on the Examiner to demonstrate that each feature of a claim is met by a reference or valid combination of references. The courts have repeatedly and consistently held that "all limitations [of a claim] must be considered ... and it is error to ignore specific limitations in distinguishing over the references." *In re Boe and Duke*, 184 USPQ 38, 40 (CCPA 1974); *see also* MPEP §2143.03. In the present case, the Examiner clearly has not met this burden.

III. *Claim 9 Is Patentable Over Ahmed in view of Kennedy*

Claim 9 depends from claim 1, and is therefore patentable for the reasons discussed above. The Examiner relies on Kennedy merely to show that a routing table associated with a network node can be updated if the information is deemed outdated, not to teach the routing of messages based on predicted future locations, as claimed.

IV. *Claims 17 – 20, 24 and 26 Are Patentable over Ahmed in view of Moon*

Claims 17 – 20 depend from claim 1, and claims 24 and 26 depend from claim 22, and are therefore patentable for the reasons discussed above. The Examiner relies on Moon merely to show that geographic and physical features that may interfere with the network may be considered when making routing decisions, not to teach the routing of messages based on predicted future locations, as claimed.

CONCLUSION

For all of the foregoing reasons, we submit that the Examiner's rejections of claims 1-21 were erroneous, and reversal thereof is respectfully requested.

Accompanying this brief is an authorization to charge the fee specified in 37 C.F.R. §1.17(f) to Deposit Accoint No. 07-1700. Please charge any additional fee occasioned by this paper to Deposit Account No. 07-1700.

Respectfully submitted,

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CLAIMS APPENDIX

1. A method for communicating via a network comprising nodes, the method comprising:

predicting a future physical location where a destination node will be located upon arrival of a message unit relayed to the destination node via the network; and

selecting an intermediate node for relaying the message unit between a source node and the destination node in response to the predicted future physical location of the destination node.

2. The method of claim 1, wherein selecting the intermediate node comprises predicting locations where a plurality of nodes of the network will be upon arrival of the message unit at each of the plurality of nodes, and performing the selection in response to the predicted location of the destination node and the predicted locations of the plurality of nodes.

3. The method of claim 2, wherein the steps of predicting the locations of the plurality of nodes and selecting the intermediate node are performed by at least one of the plurality of nodes.

4. The method of claim 3, wherein the steps of predicting the locations of the plurality of nodes and selecting the intermediate node are performed simultaneously.

5. The method of claim 3, wherein predicting the locations of the plurality of nodes occurs upon arrival or prior to arrival of the message unit at each of the plurality of nodes.

6. The method of claim 3, further comprising sharing the predicted locations of the plurality of nodes with other nodes of the plurality of nodes.

7. The method of claim 2, wherein selecting the intermediate node comprises predicting locations where a plurality of nodes of the network will be upon arrival of the message unit at each of the plurality of nodes, and performing the selection in response to the predicted location of the destination node and the predicted locations of the plurality of nodes for relaying the message via at least one of the plurality of intermediate nodes.

8. The method of claim 7, further comprising causing at least one of the source node and the plurality of nodes to attach to the message unit state information comprising at least one of a prior speed, a prior direction, a prior destination, and a prior location of at least one of the nodes.

9. The method of claim 7, further comprising causing one of the selected plurality of intermediate nodes to alter a routing list of future intermediate nodes of the selected plurality of intermediate nodes when the predicted location of the destination node was based on outdated information.

10. The method of claim 2, wherein selecting the intermediate node further comprises selecting a sequence of at least one intermediate node of the plurality of nodes whose predicted location is closer to the predicted location of the destination node than is at least one other node of the plurality of nodes.

11. The method of claim 1, wherein selecting the intermediate node comprises selecting a node whose predicted location is within a transmission range for receipt of the message unit.

12. The method of claim 1, wherein the location of the destination node is predicted in response to state information associated with a prior state of the destination node, the state information comprising at least one of a prior speed, a prior direction, and a prior location of the destination node, and a time stamp identifying an age of the state information.

13. The method of claim 12, further comprising causing the state information to be attached to the message unit, and causing at least one of the intermediate node and the destination node to retrieve, alter, and reattach the state information, wherein altering comprises (i) replacing at least a portion of the state information with information having a more recent time stamp or (ii) adding information having a more recent time stamp.

14. The method of claim 1, further comprising causing a node of the network to broadcast to a plurality of nodes of the network a request for state information of the plurality of nodes.

15. The method of claim 1, further comprising attaching to the message unit information identifying the predicted location of the destination node.

16. The method of claim 1, further comprising causing the intermediate node to select a next intermediate node for relaying the message unit between the intermediate node and the destination node in response to the predicted location.

17. The method of claim 1, further comprising acquiring geographic information identifying physical features.

18. The method of claim 17, wherein the physical features interfere with network communications.

19. The method of claim 17, wherein acquiring geographic information comprises inferring the physical features from attenuation of at least one transmitted signal.

20. The method of claim 17, wherein selecting the intermediate node comprises selecting a node whose predicted location is essentially unobstructed by the physical features.

21. The method of claim 1, wherein the message unit is associated with a binary data packet, and further comprising repeating predicting and selecting for each one of a series of data packets.

22. An apparatus for routing communications via a network comprising nodes, the apparatus comprising:

a location prediction processor for predicting a future physical_location where a destination node will be upon arrival of a message unit at the destination node; and

a relay node selector for selecting an intermediate node for relaying the message unit between a source node and the destination node in response to the predicted future physical location of the destination node.

23. The apparatus of claim 22, further comprising a state information storage unit for storing state information associated with at least one of a prior state and a predicted state of at least one node of the network.

24. The apparatus of claim 22, further comprising a geographic information storage unit for storing geographic information identifying physical features that obstruct the network communications.

25. The apparatus of claim 22, further comprising a state information examination unit for examining state information attached to the message unit.

26. The apparatus of claim 25, wherein the state information examination unit examines geographic information attached to the message unit.

EVIDENCE APPENDIX

There has been no evidence submitted under 37 C.F.R. 1.130, 1.131 or 1.32 in this case.

RELATED PROCEEDINGS APPENDIX

There have been no proceedings related to this case.